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corresponding stimulus; they are, however, not merely connected with it; they express the changes in the condition of consciousness which arises on the entrance of the corresponding stimulus into the field of consciousness.

3. One does not meet pure and simple feeling processes. The mixed forms continually appear and the purely simple forms cannot be isolated.

4. The fundamental forms of feeling cannot be referred to two fundamental forms, such as pleasure and displeasure. They form a vast manifold and are grouped into three feeling directions, as Wundt has contended: *Lust-Unlust*; *Spannung-Lösung*; *Erregung-Beruhigung*.

5. The feelings, when they possess sufficient strength, are always accompanied by certain changes in the respiration and the pulse-beats. These changes serve as objective symptoms of the feelings. By the changes in the expression curves, six forms of feeling are determined.

6. Opposite changes in the expression curves correspond to the opposite feelings. They can be represented best by the foregoing scheme. p. 269.

W. L. GARD.

The Doctrine of Primary and Secondary Elements, by DR. BORIS SIDIS, Brookline, Mass., Psychological Review, Vol. XV, Nos. 1 and 2 (January and March 1908).

Perception is treated from the standpoint of both the normal and abnormal mental life. The views of James Mill, Sully, Höffding, Taine and Wundt are objected to, on the ground that they compound perception from ideas or images. The fallacy of failing to distinguish between centrally and peripherally excited sensations is seen further in Titchener; Baldwin and James avoid this fallacy. But the mistake of identifying the ideational and sensory processes is common and is to be traced back to Spinoza who made the image a weakened sensation and the sensation an intensified image. This theory is perpetuated through Hobbes, Locke, Hartley, Hume and James Mill to our times.

The author's idea with reference to the prominent and then the less conspicuous elements in perception is expounded by means of the relations of nucleus and cytoplasm in the organic cell. The slightest change in the prominent or nuclear elements brings about a considerable modification of the percept. A considerable change in the subordinate or cytoplasmic elements is needed to bring about a change in the percept. Consciousness plays with its searchlight on the nuclear sensory elements. The subordinate elements are indefinite, indistinct, in fact, may be even entirely subconscious, yet they form the main content of the percept giving it the fullness of reality. The percept is thus to be viewed as a compound whose elements are disguised and transformed by the qualitative aspect of the central elements. These central elements are, with their emotional and affective tone, the key to the situation. Biologically they are the trigger for the release of definite reactions and reveal the purposiveness of the percept.

The differentiation of the primary and secondary elements is seen in the *directness* or *indirectness* of the effects of the sensory stimuli upon the sense organs. In seeing an object other sensory elements are experienced beside the visual. These are not memory images; they have the same sensory characters as the elements given by the direct impression of the sense organs. The central sensory elements are *primary*, the subordinate are *secondary*. That these secondary elements are not ideational is seen from the differences between the ideational and perceptual. These are four: (a) A sensation has intensity, an image totally lacks it; (b) the image is a reproduction or

rather a representation of a sensation, but no sensation represents another; a sensation is an immediate experience; (c) a sensation bears the mark of externality, an image lacks it; (d) a sensation cannot be called up at will, while an image is independent of peripheral stimulation and is usually under the control of the will. Hallucinations are made up of sensory elements, while hypnotic hallucinations are made up of images. The muscular and tacto-motor sensations appearing as visual, when an object is seen, are not memory images, they are actual sensations, *secondary* sensations, giving fullness of content to the percept, having visual sensory elements as its nucleus. Pathology confirms this view. In certain mental diseases the patient can perceive but he cannot ideate. In others he can ideate but not perceive. Clinical cases point to the qualitative differences of image and sensation, irrespective of the assumption of localization. There are no memory images in perceptual consciousness although the latter may be closely associated with the ideational processes. Put briefly: "the external excitation acting in a particular sense organ produces its appropriate sensations but the peripheral physiological process diffuses, or rather to say, gets irradiated along other neurons of other sense structures, awakening their appropriate sensations. Such sensations, not being directly, but indirectly peripherally initiated should be regarded as secondary sensations." That secondary sensations are sensory and not ideational is seen from the fact that they can be produced only by a stimulus and by their own specialized peripheral physiological processes. One sensation always calls forth only a particular sensation and no other one, and that of a qualitatively different domain. "The main content of the percept consists of hallucinatory secondary sensations. Percepts and hallucinations are of the same grain. A percept is an hallucination with the primary nuclear sensory elements present; an hallucination is a real percept with the primary sensory elements absent." The dissociation of the secondary sensory elements from the primary elements causes us to regard the former as central phenomena — or as abnormal — but it is only the dissociation which is abnormal. When appearing isolated secondary sensations are the simplest form of hallucinations, which become more and more complex as the secondary elements dissociated from the primary became manifested in complex systems. Secondary sensations though present in every percept rarely appear in isolation. The affinity of secondary sensory elements to run into compounds becoming synthetized with primary elements makes it difficult to observe them except in synesthesia and in the abnormal states of hallucination. Cases of visual and auditory hallucinations are cited. These are cases of the dissociation of the primary and secondary elements. This dissociation is often so deep and extensive that the synthetized system of secondary elements does not bear the least trace of the qualitative aspect of the primary elements; thus a morbid condition of the pharynx may give rise to an auditory and even to a visual hallucination.

The whole discussion is clear, and while perhaps in some minor points lacking in discrimination, is exceedingly suggestive, and will prove valuable in opening up some new lines of treatment.

E. E. WEAVER.

Ueberblick über die Geschichte und den gegenwärtigen Stand des psycho-physiologischen Problems der Augenbewegung, by R. HERBERTZ. Zeits. f. Psy., 1907, Vol. 46, No. 2, pp. 123-141.

This is an eminently successful attempt to present in succinct form the historical development and present status of the problem of eye-movements. The author first points out that the problem is not